

RESEARCH INTO THE LIFE OF THE TISZA CONFERENCE ON TISZA RESEARCH IN 1974

Compiled by

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The Tisza-Research Conference that has become customary to be held in recent years was again held in 1974; on 19—20 April, in the Assembly Hall of the Club-house of the Academy Committee in Szeged. The lectures of the Conference were attended at, apart from the Tisza-researchers, by several guests, as well, participating in the discussions, too.

I. Prof. I. HORVÁTH:

Chairman's address

Honoured Tisza-Research Conference,
Ladies and Gentlemen,

I am pleased to greet the members of the Tisza-Research Working Committee and our dear guests. Several others have asked to be excused for being absent owing to pressure of their business in other directions.

Of late years, this Conference arranged in the spring months became traditional, giving opportunity to the members of the Tisza-Research Working Committee to inform one another about their results achieved and their plans, being for us all a useful exchange of working methods, promoting a really complex solution of our scientific programme.

It is a welcome change that the number of scientific lectures registered for our Conference have increased as compared with those last year: while in 1973 eleven lectures were delivered at the Conference, at present eighteen researchers will lecture. I am glad, moreover, because approximately half of the lectures will speak about the results of the scientific research work performed in our two basis-areas (in the Kisköre District and in the Region Conservation District at Mártély-Sasér), and even the problems of the other lectures, as well, are connected with these questions.

The Tisza-Research Working Committee and its executive committee have for some years good connections with the Hatchery and Research Institute for Pisciculture, Szarvas, and that is very important for the Tisza research. I am, therefore, particularly greeting the lecture of the Director of that Institute registered for the programme of our Conference.

The lecturers of Department of Zoology of the Lajos Kossuth University, Deb-

recen, are tankig part first in our Conference, after getting connected actively with the investigations in the Kisköre district last year. This participation is all the more such a welcome news because it means the extension of the Tisza research.

For us it is also very important that a well-equipped laboratory has been organized at the Kisköre river barrage by the Water Management of the Middle—Tisza Region. That is promoting not only the work of researchers working in the laboratory and cooperating with us but also that of our whole working committee. After mentioning these ideas in advance, I declare the meeting open.

2. M. MARIÁN:

Results of the Tisza Research in 1973 and plans for 1974

3. M. SZALAY:

Activity, results, part of the Hatchery and Research Institute for Pisciculture, Szarvas, in the Tisza research

In our country, owing to a wrong decision, the Research Institute for Pisciculture that since 1906 had performed various duties was dissolved and functioned for ten years but as a Division of Pisciculture connected to the Research Institute for Raising Small Animals, Gödöllő, under unfavourable conditions and with a reduced working force as compared to the earlier state.

The lack in an actual piscicultural research in our country made itself felt after some time on national-economy level, as well. For eliminating that, since January 1st, 1969, Szarvas was assigned to be the centre of the national piscicultural research by our highest authority because it found guaranteed here the conditions necessary for the real research work.

A five-year middle-distance research programme, closed in 1973, was solved by the research workers of the Institute. The results and tasks of this work were reported on and the next major tasks outlined by the lecturer. In respect of Tisza research there are important tasks: region conservation, the investigation of growth rate and migration of the various sorts of fish, as well as the systematic investigation of the zooplankton and benthos in the Tisza reaches above the water barrage and in the reservoir for several years and always embracing the whole of the year. These investigations are necessary to determine with a rough estimate the stock of food needed by fish for a given season. It can only be imagined in this way to plant the Tisza, and the other natural waters, too, with fine young fish in the future.

Contributions to the discussion:

B. SZÓKEFALVI NAGY: Asks whether the dead-arms mean any change in respect of fishing.

The lecturer's reply: At present they still mean but an unexploited, hidden reserve.

Á. HARKA: Can the amur multiply in our country under natural conditions?

Reply: It is imaginable theoretically although their stocking is subject to licence for avoiding problems in case of a faulty introduction of these.

4. J. HAMAR:

The effect of impoundment upon the water quality of the Tisza in the district of the Kisköre river barrage.

(Published in Vol. 11 of the Tiscia)

Contributions to the discussion:

I. HORVÁTH: Asks if the suspended-matter content has a part in the minimum heat-difference between the surface and deep water-layers.

The lecturer's reply: At Kisköre there is a lower through-flow; the above fact may be explained by that.

- K. BÁBA: What is the quantitative difference in zooplankton as compared to the dead-arms?
Reply: In the Reservoir the amount of zooplankton is much lower.
- A. SZITÓ: Asks which Cladocera species is predominant in the plankton of the Reservoir.
Reply: *Bosminalongirostris*.
- I. HORVÁTH: Asks in what a distance the damming up of water is getting on above the Reservoir.
He suggests investigating the effect of impoundment in a larger distance above the Reservoir.
- K. KISS: Asks what we understand under the effect of damming up.
Reply: It means how the water-quality changed as compared to the earlier state. That isn't effective in respect of every factor, resp. It is only observed in certain reaches.
- M. ANDÓ: The effect of damming up the water is modified by the rivers streaming in.
- GY. DÉVAL: At Kisköre the problem of impoundment is complicated. The influence of the affluents should, indeed, not be neglected as the picture can be modified by the passing water-masses.

5. J. SZABÓ:

Some hydrobiological peculiarities of the reservoirs and their part in the complex utilization of the Kisköre Reservoir

The study of water animals, water ecology has some traditions at the Department of Zoology in the Lajos Kossuth University. Since 1962, the education in hydrobiology has also been going on in the Department what has resulted in developing a good cooperation with the organs of water administration, particularly the Water-quality Supervision of OVH VIKÖZ (National Water Office Centre of Water Supply Economy Management and the Water Administration of the Middle-Tisza Region). The cooperation, realized in socialist treaties and agreements of external research and improvement, has brought about good conditions for us to solve the tasks both of the basic and the applied researches. We have started comprehensive investigations to study the theoretical and practical problems of biological water-quality and to examine the water-quality of the Kisköre Reservoir prognostically, in close cooperation with the laboratory there. My co-workers are reporting on the results of researches begun and achieved so far, and I myself am outlining a part of the preliminary conclusions drawn from the investigations performed in the reservoirs at the Volga (at Ivanovo, Uglich, Ribinsk, Gorky, Kuybischev, Saratov, Volgograd), with environmental conditions that are somewhat similar to ours, which conclusions can be utilized for our purposes, as well. The generalized experiences are as follows:

After filling up the above reservoirs with water, there could be distinguished three subsequent periods of the biological succession: (1) The original biocenosis of the river and of the district filled up becomes disintegrated; (2) temporary animal- and plant-communities come into being; (3) the new, dynamic stable biocoenosis is developing.

The process outlined is of different intensity in the various groups of organisms (enabling us to concentrate on certain investigations). The change in plankton is the quickest, its complete transformation may last about three years long. The benthos-transformation is a little slower, about 3 to 4 years. The development of macro-vegetation is the slowest, with an about 10 to 20-year period.

Conclusions for the Kisköre investigations:

- (1) Before filling up the reservoir, the quantitative and qualitative composition of the original benthos and plankton of the Tisza is to be measured.
- (2) After filling up the reservoir, we have to reckon with a rather long-period succession. Mainly the processes of the first 4 to 5 years are to be supervised. Under

the conditions of our country, we have to reckon with the acceleration of the succession and a considerable increase in the amplitude of fluctuations.

(3) The processes of succession make progress in the direction of stabilization — if the bed of the reservoir and the water filled in are free of the organic matters and poisoning matters exceeding the „normal extent”.

As the development of the processes of succession to be expected under natural conditions may be modified by the latter ones considerably, and as we have to reckon with these:

a) We have to ask for preliminary and continuous informations on the water-quality above the Tisza reservoir; b) we have to ascertain by means of model-examinations in advance of how the biological succession is modified by the vegetation formations left behind in the reservoir. These investigations have already begun.

Contributions to the discussion:

- I. HORVÁTH: Asks in which degree it is real to draw a parallel between the Volga and the Tisza. The lecturer's reply: The rather shallow Russian reservoirs (at the Volga) are most of all similar to ours as proved so far by literary and local investigations. There are, of course, some differences, too. *E. g.*, the bed of the Volga is poor in vegetation.
- GY. DÉVAI: There are to be compared with each other the regions that are less or more similar to one another in respect of the main climatic factors. Between the Kisköre and Volga reservoirs, besides their individual features, a parallel may be drawn in respect of water depth.
- M. MARIÁN: The multiplication of Amphibia species is to be expected in the district. He regards, therefore, desirable to measure their present quantity and follow their later development with attention.

6. GY. DÉVAI:

A prognostic investigation of the biological water-quality in the Kisköre reservoir.

The lecture is surveying the facts and circumstances that are fundamentally determining, resp. will influence in the highest degree the biological water-quality in the Kisköre reservoir. On the basis of evaluating these and exploring their causal connections, it is establishing that our most important tasks are to be grouped round two points of view.

First it is to be determined, speaking in a general way, what the effect of:

- a) the shallow-lake character of the reservoir,
- b) the water-quality of the Tisza-reaches above the reservoir,
- c) the organic matters left behind in the inundated area,
- d) the communal and industrial waste-waters, resp.
- e) the water utilizations at the operation of the reservoir,

will be upon the water-quality of the reservoir, and how far they will influence the intended complex utilization of the Kisköre river barrage and reservoir.

At any rate, our work can only be really successful in respect of the protection and regulation of water-quality if the prospective effects and points of attack of the factors enumerated above were previously “scanned” with model-experiments.

The model-investigations are to be started with a double aim:

1. “theme-oriented”, *i. e.*, by modelling the “whole” of the Kisköre reservoir, resp.:

2. "problem-oriented", *i. e.*, by modelling a single factor or a factor-system seeming to be the most important in forming the water-quality or by modelling the effect of these.

In addition to clearing the general peculiarities mentioned above, we regard as extremely important to organize the systematic control of water-quality and the collection of facts in the dammed up bed-stretch of the Tisza, giving us exact and evaluable results, and the same in some parts of the watershed-area of the reservoir that are prominently important in respect of protecting and regulating the water-quality. Our aim is to bring about a comparative basis that is absolutely necessary to evaluate the results of later investigations in their causal relation.

Finally, the lecture expresses the confident hope that as a result of the programme, — coordinated and directed by the Water-quality Supervision of the Centre of Water Supply Economy Management of the National Water Office and carried out by the Department of Zoology and Anthropology in an exemplary and close cooperation with the Water Administration of the Middle-Tisza Region, — we shall get to a real and right explanation of the particular events taking place in the water system of the Kisköre reservoir and then, as a result of all these, to an active and productive intervention in the course of water processes, contributing in that way to the successful realization of the complex economy of water-supplies of the Kisköre river barrage.

Contributions to the discussion:

M. MARIÁN: Proposes to let known the ideas of the lecturer in wider circles.

I. HORVÁTH: Asks what kind of concrete researches are planned in the future.

The lecturer's reply: After collecting the data up till now, a 5-year plan of research will be elaborated by the operative committee to be established in Kisköre.

GY. BODROGKÖZY: The increase in humus-formation means a great problem, sodification is inevitable. What is done to solve this problem?

Reply: Mainly at the summer low water, unfortunately, water-quality will strongly be vitiated by the heat power station. It is tried to help for it also by measuring the upper polluting factors and respecting in the maximum way the rules of waste-water clearing.

7. KLÁRA HORVÁTH:

The vertical distribution of oxygen content in the Kisköre reach of the Tisza at Kisköre and Tiszacsege

The considerable water-mass of the Kisköre reach of the Tisza cannot be regarded as a real river-water even in the present period of damming up. Taking into consideration the 9 to 10 m water-depth formed immediately above the river barrage, as well, it is justified to raise the question if a stratification in limnologic sense has developed. That can be decided in the simplest way by studying the vertical distribution of water temperature and dissolved oxygen.

On August 16, 1973, at Tiszacsege, at three points of the cross-section of the bed and at Kisköre, above the river barrage, at two points of the drift-line we carried out measurements. On September 8, at Kisköre at the same place we were measuring again, passing towards the bottom with always exactly half a metre distances, and by help of a DELTA M85 type oxygen-meter.

At Tiszacsege, the dissolved oxygen uniformly decreased down-wards from the surface between the values 8.5 and 7.5 mg/l. Oxygen-saturation was everywhere above 90 per cent. At the same point of time, at Kisköre, a change in similar direction of a little lower dissolved oxygen values was observed. The decrease in temperature was inside 2 °C, oxygen-saturation fell 10 per cent from the surface down to the

bottom. In case of all the three parameters we got a similar uniform decrease at the measurements on September 8, as well, but inside a still smaller interval than earlier.

On the basis of our results we may establish that in the reach of the Tisza at Kisköre there couldn't be demonstrated any stratification, at least in the places and at the points of time of our investigations.

Contributions to the discussion:

D. GÁL: Asks if there are oxygen-content investigations in the reaches above the reservoir.
The lecturer's reply: In the above place he hasn't carried out any oxygen-content measuring.

7. I. KISS:

Occurrence of Botrydia in the flood-land of the Tisza and the Maros

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Contributions to the discussion:

GY. BODROGKÖZY: At measuring the flood-land phytomass, we had to follow with attention the larger units, as well, placing Botrydia, too, into the synusia.

I. HORVÁTH: Asks by what environmental conditions the mass-production was released.

The lecturer's reply: The mass-production appeared after the spring-flood had passed and, in short, the lasting, sunny warm weather had come to an end.

9. T. K. KISS

The quantitative relations of phytoplankton in the dammed Tisza reaches at Tiszalök and in the Eastern Main Channel

Contributions to the discussion:

J. SZABÓ: It is praiseworthy that the lecturer is looking for a causal relation. He is drawing the attention to some cooperatives established by several specialists, and to the importance of the interdisciplinary cooperation.

A. SZITÓ: He would approve of carrying out a complex Tisza-investigation and even of increasing it.

I. HORVÁTH: The research bases have been established (Kisköre, Körvélyes), the cooperation of research teams is increasing (the researchers of Debrecen). All these are exerting their effect for expanding the investigations:

10. I. HORVÁTH and GY. BODROGKÖZY:

The effect of mowing on the organic-matter production of the meadows in the flood-area of the Tisza

Contribution to the discussion:

GY. DÉVAI: Asks what an amount of stock the plant communities at Kisköre mean.

The lecturer's reply: At Kisköre, the authors have carried out measurements of other type, they have, therefore, no data in this respect.

11. M. ANDÓ:

Areal ecological conditions of the Region-Conservation District at Mártély-Körtvélyes

The Region-Conservation District is forming in regional sense a part of the Southern Tisza valley where but a lower proportion of the homologous facies groups have remained in their natural state. They have become here, in a larger part of the natural ecotope groups, economic ecotopes under the influence of the anthropogenous activity.

In the geographic environment transformed by the social-economic activity, the natural factors exerted their effect similarly in a changed degree and with a changed speed. Since the turn of the century, the effects of the anthropogenous activity have often fused casually some units differing from one another ecologically, as well, into regions of the same type. The ecological types like these are the flood-land plough-lands, the agriculturally cultivated areas where there was already formed an excellent soil-structure to a considerable extent, and the feature of the soil is developing from meadow an alluvial into an open-country soil type.

The effect of human activity is already less considerable at the grassy surfaces (meadow, pasture) of the flood-land. This ecotype is characterized by that the mutual connections of the factors of natural geography are sharply reflected in the single qualitative and quantitative potentialities.

One of the most considerable natural and anthropogenous ecotope groups of the region is the flood-land forest stand. This ecotype is showing considerable heterogeneity in the distribution of species (from plane-tree up to willow) in the flood-area. The ecotope that not always can be brought into correlation with the relief of the terrain and other natural facts, is reflecting a considerable effect of the anthropogenous factor. In the wood-environment formed artificially in the flood-land since the turn of the century, several relict ecotypes have been regenerated, too, where the natural geographic processes have considerably increased and the anthropogenous influences decreased.

12. R. VAMOS:

Pollution of the Tisza dead-arms and the thermal waters

A part of the Tisza dead-arms are utilized piscatorially, as well. Although the stock of fish is from time to time increased by introduction and feeding also takes place, fish-breeding is still risky because, every now and then, fish perish in large numbers. From the cases till now we may draw the conclusion that every factor that promotes the bacterial sulphate reduction, *i. e.* the formation of hydrogen sulphide, is at the same time responsible for the destruction of fish, as well. Fish destructions are frequent in the dead-arms in whose neighbourhood the application of N-fertilizers is increased. Eutrophization is considerably promoted by the vegetable mineral foods washed into. In increasing the degree of nitrogen supply, a part is played by the thermal waters, as well, that are containing a large amount (5—13 mg/l) of ammonium. Ammonium being the only N-source of the sulphate-reducing bacteria, that is also an important factor of sulphate reduction. In order to promote the oxidation of ferrous sulphide accumulated in these lakes, it is right to treat these dead-arms similarly to fish-ponds, emptying them entirely after being fished.

Contributions to the discussion:

Á. HARKA: Asks what preliminary safety measures could prevent fish destruction in the Kisköre reservoir.

The lecturer's reply: The chemical protection is not good as no lethal concentration can be achieved in the deeper parts owing to dilution.

Á. HARKA: Reckoning with 1.5 m fluctuation of the water-level, is or isn't to be expected a negative influence of the partial drying-up?

Reply: A partial drying up won't have any harmful effect.

A. SZITÓ: In case of drawing the dead-arms into fish-breeding, in which phase the fish destruction by hydrogen sulphide may take place?

Reply: The dead-arm must be treated fishpond-like and emptied periodically. For protection he would consider good to spread calcium nitrate into the water, in order to neutralize hydrogen sulphide.

13. J. SZÉPFALUSI:

Influence of the Novi-Becse river barrage on the Tisza stretch in County Csongrád. Protection of water-quality. (Detail of a monograph)

The effect of the river barrage, being under construction at Novi-Becse (Yugoslavia), to be exerted on the water-quality of the river stretch between 158 and 244 river-km above the barrage cannot be "predicted". Even the measuring-series — carried out for several years in the interest of the aim and with full knowledge of the task since much earlier times — couldn't present any safe basis for solving the task.

The solution of the problem by only qualitative deliberations is made more difficult by that even the effect of the Tisza II river barrage upon the Tisza stretch investigated is not yet known, at present. It may be supposed that the surface, covered with a vegetation owing to being inundated durably by water as a consequence of the raised water-level, will in the first years influence the quality of water, as a result of decomposition, more intensively than on the average.

The hydrobiological characterization of water is carried out by the aid of its halobity, toxicity, saprobity, and trophity. The significance of these four factors is different in cases of a river and of standing waters. In the Tisza, damming is not inducing any considerable change in its halobity. It is not damming, either, that may cause a possible catastrophe in its toxicity but the admission of toxic matters, e. g., pesticides, poisons of industrial origin, over certain limits. To be sure, it is not certain that the measure of toxicity is independent of the self-purifying power of water connected with its flowing conditions, but an unambiguous correlation cannot be established. At any rate, so much can be ascertained, even previously, that it is justified to preserve the stringency of the practice followed so far here in respect of how to drain the poisoning waste-waters in the future, too. And in respect of preventing removing, systematically the toxic water pollutions induced by the chemicalized agriculture, there are needed further considerable measures, as well.

One of the results of the transportable smaller suspended-matter content, caused by the Novi-Becse barrage-induced diminished water-speed, is that thus a thicker water-layer can be illuminated by sunshine. The decreased suspended-matter content is, at the same time, resulting in reducing the effect of the suspended load on crushing, damaging the micro-organisms. These two factors may be, under given conditions, a hotbed of the regular summer development of algal blooms in the Tisza.

Taking into consideration that the effects outlined are in connection with living result of decomposition, more intensively than on the average.

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One of the results of the transportable smaller suspended-matter content, caused by the Novi-Becse barrage-induced diminished water-speed, is that thus a thicker from those mentioned above, of several environmental factors, in the most various ways. These changes may have an influence through the food-chain upon the macro-fauna, as well.

In the mud — in extreme cases — a hydrogen-sulphide accumulation, too, can occur. In the region of some waste-water disposals this may manifest itself in the increase in local toxicity.

Contribution to the discussion:

GY. DÉVAI: On the basis of several data to be found at the Centre of Water-Supply Economy Management, we should need a preliminary survey in respect of the future storing conditions. But there was no such preliminary survey in case of Kisköre, either.

14. MÁRIA CSOKNYA and MAGDOLNA FERENCZ:

Data on the horizontal and vertical distribution of the zoobenthos fauna of the Tisza

Lecturers are reporting on some data on the zoobenthos fauna in other substratum-types of the Tisza, resp. the quantitative and qualitative distribution of these.

Contributions to the discussion:

M. ANDÓ: He would favour measuring the stream of river-water. The daily change in sediment-movement is also an important modifying factor.

Á. HARKA: Asks what the cause and measurement of the quantitative decrease in may-fly larvae are. The lecturer's reply: She does not know any exact data but it is an empirical fact that the may-flower larvae are perishing in the Tisza. The causes of that may be looked for partly in the regularization of the river-side, partly in the increasing water pollution.

K. BÁBA: The phenolic pollution measured in the Maros may also have an influence on the decrease in larvae.

15. I. DOSTÁL:

The comparative ecological investigation of sub-orde Hydrocori-sae in the relation of a Tisza dead-arm and some natron lakes

Time of sampling: From May 1970 up to October 1971.

There were performed systematic samplings in the Tisza dead-arms at Szeged. The water depth of the sampling sites did not surpass 70 cm. I generally sampled successfully from free water-surfaces rich in vegetation or surrounded by plants.

The chemical composition of water included: Na—MgCO₃, HCO₃, SO₄, Cl,

Annual pH period:	March	July	October
	6.0	8.4	6.3
Water temperature	8.0 °C	24.5 °C	12.2 °C
O ₂ household of the water:	June	September	October
O ₂ -consumption:	43 mg/l	54 mg/l	49 mg/l
Dissolved O ₂	9 mg/l	10.5 mg/l	14.2 mg/l
O ₂ -saturation	101%	107%	131%
BOI ₅ :	8.7 mg/l	17.4 mg/l	24.7 mg/l

The pH of the isolated marshy waters never exceeded 7.5 but their BOI₅ value is high, O₂-saturation is low, and the temperature of water is extremely fluctuating.

In Lake Fehér-tó and that of Rókus, I carried out samplings in the months August and September, in 1970 and 1971.

The water included chemically Na₂CO₃ and NaHCO₃, its pH moved between 9 and 11, its temperature between 27 and 29 °C. The water at Rókus is an alkali marshy tract, that of Lake Fehértó is mixed with Tisza water.

In Lake Fertő (or Lake of Neusiedl, between Hungary and Austria) I collected material from June to August, 1971. The pH of water fluctuated between 7.2 and 8.3, its temperature was between 23 and 25 °C. The water includes chemically Na₂SO₄.

The percentage, appearance, development, and disappearance of the Hydrocorita species occurring the most frequently are summarized in the following Table.

Species	Sampling site, time	Dead Tisza- arm					Percentile occurrence in Lakes Fertő—Fehér—Rókus			
		Annual 1970	total % 1971	Appearance	Imago max.	Larva max.	Imago disappears			
<i>Naucoris cymicoides</i>		16	24	M.	M. Sept.	May July	Oct.	44.8	—	—
<i>Plea Leachi</i> (m)		16	18	Feb.	May July	June July	Oct.	2	—	—
<i>Notonecta glauca</i>		1.3	7.5	Feb.	Apr. May	May June	Oct.	—	0.25	—
<i>Nepa cinerea</i>		2.41	6	Apr.	July	June	Oct.	—	—	—
<i>Sigara lateralis</i>		29	17	Apr.	Aug. Sept.	Aug. Sept.	Nov.	39.3	81	93
<i>Cymatita coleoptrata</i>		27	4.5	M.	June Aug.	June Aug.	Sept.	10.7	—	—
<i>Sigara striata</i>		—	7.9	Feb.	Apr. Aug.	June Aug.	Oct.	—	6	—
<i>Corixidae</i>		56	26.4	Feb.	July Sept.	July Aug.	Nov.	50	93	99

Contributions to the discussion:

M. MARIÁN: Congratulates to the devoted work of the lecturer, asking him to get on with developing his investigations.

A. SZITÓ: The subject is very fruitful because our knowledge of the nourishment and habits of water-bugs is rather defective although the part they have in the fish-ponds is very considerable (e. g., fish-parasites).

M. ANDÓ: Suggests the author to watch primarily their daily living rhythm.

The lecturer's reply: He would like to complete his field-observations with experiments in aquaria, particularly as regards nourishment and individual development.

16. L. GALLÉ, Jr.:

Recent faunistic and ecological data on the myrmecological knowledge of the Tisza valley

Contributions to the discussion:

M. ANDÓ: Asks which what measuring technique the measurements of microclimate took place. The lecturer's reply: He accomplished preferably point-measuring by means of Assmann's psychrometer.

M. MARIÁN: Asks if the degree of parasitism is increasing as a result of the increase in ant-populations.

Reply: It is to be reckoned with parasites and predatory animals, as well.

K. BÁBA: Asks if the bunchy dispersion of nests is characteristic of ants.

Reply: In case of small population density the bunchy dispersion may occur but, as the population becomes denser it grows more and more uniform, as well.

I. HORVÁTH: Asks what in the model from the exponential curve may be concluded.

Reply: There may be concluded the density of population and the connections depending upon that.

M. ANDÓ: Asks what kind of microclimatic mean values are characteristic of a single population, in case of a medium population.

Reply: The limits of extremes are of importance, therefore, the single populations are different.

17. Á. HARKA:

Investigation of informative character on the body weight/body length relation of the pike-perch in the Tisza-stretch at Tisza-füred

The allometric relation between body weight and body length of the fifty pike-perch individuals collected between March 15 and June 27, 1973 is described by the following equation:

$$\lg W = -5.4172 + 3.2075 \lg L,$$

where W is body weight in grammes, L is body length in mm. The body length of the individuals serving for the basis of connection was more than 27 cm.

Comparating the constants of equation to the data on the stock in Lake Balaton, it appears that the individuals in the Tisza start with a smaller weight but the rate of their growth in weight is more rapid than that of the individuals in the Balaton.

Contributions to the discussion:

I. HORVÁTH: Asks what the cause of the more rapid growth in weight of the pike-perch in the Tisza is, in contradistinction to the stock in the Balaton.

The lecturer's reply: The state of pike-perch in the Balaton is genetically comparatively impoverished.

A. SZITÓ: In the Tisza there are more white-fish, a food of the pike-perch and there are no concurrents in nourishment. The continuation of investigations is justified at Kisköre by the increase in line-fishing to be expected, necessitating an intensive planting.

K. BÁBA: Says that the pike-perch, mainly in its young age, feeds on Mollusca.

18. A. LEGÁNY:

Some ornithological problems of poplars in the flood-lands of the Tisza

In the flood-area of the Tisza, in intensive introduction and production of poplars is going on. It is unambiguously proved by my systematik stand-takings in that biotope that ornithologically these areas are of low production. From among the wood types, these are the lowest ones. They have an individualized community, characterized by being poor in species and individual numbers that is, in fact, forming no homogeneous nesting community, either. I explain this phenomenon by the biotope-induced unsatisfactory nesting possibility. The ornithological production and biological wood-protection of poplars may be increased in two ways. One of these is bird-settling with artificial nest-holes, the other is settling the poplars mixed together with other three species.

19. A. BANKOVICS:

Further data on the propagation of the olivaceous warbler (*Hippolais pallida*) along the Tisza

The olivaceous warbler (*Hippolais pallida*) that in the Carpathian basin is spreading towards the north the most expressly along the Tisza, occurred already at Tiszasüly on June 15, 1973. The suitable habitats of the 200 km Hungarian Tisza-stretch south of that are populated by them. Comparing the ecological demands of the populations of the olivaceous warbler in the Carpathian basin and the Balkan peninsula, it may be established that the former ones are almost exclusively only the dwellers of the flood-land woods along the river, while the latter ones populate even the dry areas farther from the waters.

Contributions to the discussion:

M. MARIÁN: He would approve of extending the investigations towards north to (e. g., over Slovakia), resp. over other biotopes, as well.

L. GALLÉ, Sr.: Is interested in the ecological-etiological demands of the olivaceous warbler (migration, flight, singing period, etc.).

The lecturer's reply: The bird arrives late and leaves early. It only sings in incubation period (May—July), its progeny is poor (its nest is not camouflaged, nest-plunderers).

GY. CSIZMAZIA: Asks with what bird-species the warbler nests together and if it is impeded by these in adapting itself to the environment or in spreading.

Reply: He has not yet carried out investigations on this little aggressive bird, resp. his data are still unelaborated.

20. GY. CSIZMAZIA:

Mammalian associations in the Region-Conservation District at Mártély-Körtvélyes

It can be established in the course of investigating the sample areas in the flood-lands that in the Tisza valley the mammalian fauna is very dynamic. The research in a single year is but a mosaic of the varying mammocoenosis and in the following year it can often be observed only in another form. The aim is, therefore, to reveal regularities, outline and register the mammalian associations.

The development of biocoenoses under the influence of their distance from the river-water, the breadth of the flood-land, the configurations of the terrain, covering by plants, as well as duration and size of the passing flood-waves.

Dynamism is regulated by biogenous and abiogenous factors that I have tried to fix by formulating them.

On the basis of the identities of the way of life, of the constant identity and dominance it turned out that in the course of the year there are formed some mammalian associations that owing to the different degrees and climatic character of the habitats in the flood-land can be deduced from, and change into, one another. There were only four provisory divisions into groups made known by the lecturer, for lack of a uniform nomenclature of mammocoenoses and expecting further results of the work going on at present. These are the hydrobiontic, hydrophilous, hydrogradic, xerophilous associations. He was reporting on the species inducing the associations, touching also upon the ecological evolution of these.

Contributions to the discussion:

M. MARIÁN: He is pleased to greet the author passing over, after the faunistic investigations, to the ecological-coenological way.

I. HORVÁTH: Asks from where the xerophilous species got to this area.

The lecturer's reply: Migration must have taken place from the protected side, from the monocultures outside the dams. And as the flood-land is no suitable habitat for the xerothermic species, they are going with emigrating from there.

Gy. BODROGKÖZY: Proposes to characterize biocoenosis together with botany.

A. BANKOVICS: Draws the attention to the problems of trapping: The differences in activity are distorting the real data.

I. KISS: Deems necessary to investigate the problem of soil, as well, that is a considerable factor *e. g.* in case of the breaks in the embankment by the flood.

21. Prof. I. HORVÁTH:

Chairman's concluding words

Reaching the end of our two-day conference, for concluding I should like to say some words to it. I think we have all got a good survey over the research activity of the Tisza-Research Working Committee in 1973, beginning from the problems of natural geography up to investigating Mammalia. It is a good thing that the lectures were followed by vivid discussions that were sometimes even to be limited for husbanding our time.

I beg the lectures interested not to take offence at that.

The discussion following the lectures was interesting if only because climatologists, hydrobiologists, botanists and zoologists could mutually offer remarks on the lectures of one another and that is a fundamental result because of the complex character of the Tisza research.

This great interest and active discussion mentioned elicited in me the idea that it would be useful in the future to arrange, besides our annual Conferences, on a few occasions some informal "round-table conferences", as well, on one or two concrete problems, without any limitation in time. I think, *e. g.*, on the domain of biocoenosis, the problem of modelling emerging more than once at our present Conference, too, the role of researches on the local and micro-climate, the question of fish-destruction — to mention only a few problems. This problem will be studied by our Executive Committee and we will inform our members on time and subject-matter of such informal conferences.

The success of our Conference is showing the continuous development of our Tisza research. I wish every co-worker of ours a successful activity this year, too. The meeting of our Conference is closed.

After the concluding words of the Chairman, Gy. BODROGKÖZY was outlining some questions of general interest (date of handing in MSS), resp. was calling the attention on the use of the increasing library (exchange material).

The Tisza-Research Working Committee:

President: Prof. Dr. I. HORVÁTH

Botanical Vice-President: Dr. Gy. BODROGKÖZY

Zoological Vice-President: Prof. Dr. L. MÓCZÁR

Secretary: Dr. M. MARIÁN

Further members of the Committee: Dr. M. ANDÓ, Dr. MAGDOLNA FERENCZ, Prof. Dr. I. KISS